REMARKS

Claims 1-29 are pending in the application and are subject to rejection. Claims 1, 11, 24 and 25 have been amended. Support for the amendments to the claims can be found, for example, in Table 1 at page 19 and Table 2 at page 22 of the present specification. In addition, claim 25 has been amended to replace "Co/3 + Mo + 2.6Ti + 4Al" with --3Si + 1.8Mn + Co/3 + Mo + 2.6Ti + 4Al--, support for which can be found, for example, on page 13 of the present specification.

Entry of the above amendments is respectfully requested.

I. Response to rejection of claims 25-29 under 35 U.S.C. § 112, first paragraph

On page 2 of the Office Action, claims 25-29 are rejected under 35 U.S.C. § 112, first paragraph.

The Examiner asserts that the expression "(Co/3 + Mo + 2.6Ti + 4Al)" in claim 25 is not supported by the specification as originally filed.

Applicants respectfully traverse this rejection for the reason that there is support in the specification for the expression (Co/3 + Mo + 2.6Ti + 4Al). The expression at page 13 is 3Si + 1.8Mn + Co/3 + Mo + 2.6Ti + 4Al, and when Si and Mn are not present (for example, as shown in Table 1), then the formula would be (3 x 0) + (1.8 x 0) + Co/3 + Mo + 2.6Ti + 4Al, which becomes Co/3 + Mo + 2.6Ti + 4Al. Therefore, Applicants submit that there is support in the specification as originally filed for the expression.

However, Applicants have amended claim 25 to recite the original expression "3Si + 1.8Mn + Co/3 + Mo + 2.6Ti + 4Al".

In view of the amendment, Applicants respectfully submit that the rejection has been overcome, and respectfully request that the rejection be withdrawn.

II. Response to objection to claim 24 under 37 C.F.R. § 1.75

On pages 2-3 of the Office Action, claim 24 is objected to under 37 C.F.R. § 1.75 as being a substantial duplicate of claim 1.

Applicants respectfully respond as follows.

Claim 1 is directed to a maraging steel where Si and Mn may or may not be present, whereas claim 24 is directed to a maraging steel where Si and Mn are present (see language "contains each of the elements Si, Mn, Co, Mo, Ti and Al" in claim 24). Therefore, claim 1 is broader than claim 24 in scope, and MPEP 706.03(k) states that court decisions have confirmed applicant's right to restate the invention in a reasonable number of ways, and that a mere difference in scope between claims has been held to be enough.

Since the claims cover different subject matter, Applicants respectfully submit that claim 24 is not a substantial duplicate of claim 1, and respectfully request that the objection be withdrawn.

III. Response to rejection of claims 1-7, 11-16 and 22-29 under 35 U.S.C. § 103

On pages 4-5 of the Office Action, claims 1-7, 11-16 and 22-29 are rejected under 35 U.S.C. § 103 as being unpatentable over Pinnow et al.

The Examiner's position is substantially the same as that set forth in the previous Office Action. In addition, on pages 6-7 of the Office Action, with respect to Applicants' argument that Pinnow does not contain Si, Mn or Ti, the Examiner asserts that in the claims Si, Mn and Ti can be zero. The Examiner also asserts that it is well

settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art.

Applicants respectfully respond as follows.

The Co content of the Pinnow steel is 7 to 20%. In contrast, the Co content of the present invention is "not more than 6.9% Co". When the amount of Co is not more than 6.9%, Al, Si and Mn compensate for the reduced amount of Co. The maraging steel of the present invention having a Co content of not more than 6.9% exhibits a hardness of Hv 502, and therefore has substantially the same or higher hardness than that of a conventional steel containing 10% Co. *See* Table 1 of Pinnow. The effect of the present invention is attained by the addition of Al, and the other components Si and Mn.

In addition, in the maraging steel of Pinnow, the nitrogen content is restricted to "up to 0.05" (claims 1 and 3) and to "up to 0.03%" (claim 2). In contrast, the present invention restricts the content of nitrogen to be "less than 0.005% N (nitrogen)" in the maraging steel of the present invention. The content of "less than 0.005% N (nitrogen)" of the present invention is quite low.

The difference in the tolerance of nitrogen content between Pinnow and the present invention is a result of the objective of the present invention to improve the maraging steel in fatigue strength. That is, the maraging steel of the present invention is applicable to a power transmission belt used in continuously variable transmis[redacted] in motor vehicles. A maraging steel applicable to a power transmissio[redacted] continuously variable transmissions in motor vehicles are re[redacted] fatigue strength, which is at a level not require[redacted]

With regard to the fatigue strength, it should be noted that, when steel is subjected to a super high cycle vibration range exceeding 10^7 cycles, which is deemed to be a fatigue limit, the fatigue fracture of steel is not triggered from the surface thereof but is triggered from inclusions being contained therein (*see* lines 1-5 on page 3 of the present text).

Therefore, when preparing the maraging steel, it is necessary to strictly control a chemical composition of the maraging steel such that no non-metallic inclusions is formed therein. Namely, such non-metallic inclusions in steel are "defects". The defects may become trigger points that induce cracks in the matrix of the steel, resulting in a breakage of steel as a whole. There are several types of non-metallic inclusion, which include oxides and nitrides (including carbo-nitrides). In order to improve the fatigue strength of steel, it is important to prevent the formation of any types of non-metallic inclusion in the steel.

Accordingly, in the present invention, nitrogen (N), which is a non-metallic inclusion forming element, is restricted to a significantly lower level than that of Pinnow. Furthermore, in the present invention, oxygen is also restricted to a low level of not more than 0.003%, which forms oxide system non-metallic inclusions. In Pinnow, there is no disclosure, teaching or suggestion of reducing oxygen to a very low level.

From this viewpoint, the present invention is distinguishable from the steel of Pinnow, as well. That is, the chemical composition of the maraging steel of the present invention is distinguished from Pinnow because it is free of non-metallic inclusions as much as possible.

For example, Pinnow discloses that "Both die blocks of the invention contain oxide particles which are uniformly dispersed throughout the microstructure. These oxides are an inherent product of the method of atomization used in the laboratory" (*see* column 6, lines 34-37) with respect to Figs. 1b and 1c. This structure is obtained because the Pinnow steel is not required to have a fatigue strength that is resistant to breakage triggered from non-metallic inclusion, and thus oxygen is not restricted or limited in the Pinnow steel. In other words, since the maraging steel of Pinnow has dispersed "defects" (i.e. non-metallic inclusions), it is not possible to apply the steel of Pinnow to a power transmission belt used in continuously variable transmissions in motor vehicles, whereas the maraging steel of the present invention can be applied.

Accordingly, the content of oxygen and nitrogen in the maraging steel is an essential and important feature of the present invention in order to prevent formation of non-metallic inclusions in the steel.

In addition, the maraging steel of Pinnow does not contain Si, Mn or Ti. *See* col. 3 and Table 1. In contrast, the present invention according to claims 24 and 25 are different from the maraging steel of Pinnow because the maraging steel according to claims 24 and 25 require the presence of one or more of Si, Mn or Ti.

Further, Pinnow relates to maraging steel that is essentially free of titanium. *See* Abstract and Table 1.

Ti is present in an amount not more than 0.05% in the maraging steel according to claims 24 and 25, and therefore, the maraging steel of the present invention is different from the steel of Pinnow, which does not contain any Ti or contains Ti in an amount above 0.05%.

In summary, even when the amount of Co, as well as Ti, is reduced, one of ordinary skill in the art would not have expected that a high level of hardness could be achieved by intentionally adding an appropriate amount of Al, which is a remarkable distinction between the present invention and Pinnow. In addition, the addition of Al is one of the reasons why it is possible to reduce the content of Co to an amount of not more than 6.9%.

Therefore, in view of the advantage brought about by the positive addition of Al in a maraging steel containing a low amount of Co, the present invention is distinguished from the steel of Pinnow.

In view of the above, it is respectfully submitted that Pinnow fails to teach or suggest the present invention, and withdrawal of the foregoing rejection is respectfully requested.

IV. Response to rejection of claims 7 and 17 under 35 U.S.C. § 103(a)

On page 5 of the Office Action, claims 7 and 17 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pinnow, and further in view of Whitaker.

The Examiner's position is basically the same as that set forth in the previous Office Action.

Applicants respectfully submit that claims 7-10 and 17-20 should be allowed by virtue of their dependence from claims 1 and 11, respectively, and for the same reasons as claims 1 and 11 as discussed above.

In addition, Whitaker discloses a variant of the maraging class of steels which contains 2% Mo. In contrast, the maraging steel of the present invention contains 3.0

to 7.0% Mo. If the Mo content is less than 3.0%, the steel is deteriorated in tensile strength (*see* lines 20-21 on page 10 of the present text).

While the Examiner indicates that Whitaker discloses a refined grain size, one of ordinary skill in the art would not arrive at the present invention, which contains 3.0 to 7.0% Mo so that the steel is applicable to a power transmission belt used in continuously variable transmissions in motor vehicles, based on the disclosure of Whitaker, which only discloses an alloy containing a low level content of 2% Mo.

In view of the above, withdrawal of the foregoing rejection is respectfully requested.

V. **Response to rejection of claims 8-10 and 18-21 under 35 U.S.C. § 103(a)**

On pages 5-6 of the Office Action, claims 8-10 and 18-21 are rejected under 35 U.S.C. § 103(a) as being unpatentable over references as applied to claims above, and further in view of JP 62-080225 (abstract) or JP 63-026345 (abstracts).

The Examiner's position is substantially the same as that set forth in the previous Office Actions.

Applicants respectfully traverse this rejection for the reason that claims 8-10 and 18-21 should be allowed by virtue of their dependence from claims 1 and 11, respectively, and for the same reasons as claims 1 and 11, as discussed above.

In addition, the secondary references relate to subjecting a maraging steel to a nitriding treatment; however, the chemical composition of the steel is not discussed.

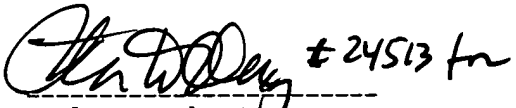
In view of the above, withdrawal of the foregoing rejection is respectfully requested.

VI. Conclusion

Reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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